CLAIMS

1. A fuel cell system (FS) comprising:

an energy supply (ES) comprising a fuel cell (1), a power distributor (4) connected to the fuel cell (1), and a secondary cell (7) connected to the power distributor (4);

a load set (IL, 6) connected to the power distributor (4); and

a controller (8) configured to control the power distributor (4) to warm the energy supply (ES) by alternatively repeating:

a first power distribution (S22; SS61) having first power (G; Gm) generated at the fuel cell (1) and distributed to the secondary cell (7) and the load set (IL, 6); and

a second power distribution (S17; S71) having a combination (G+Dp; Gr+Dp) of second power (G; Gr) generated at the fuel cell (1) and third power (Dp; Dp) discharged from the secondary cell (7), distributed to the load set (IL, 6).

2. A fuel cell system (FS) according to claim 1, wherein the load set comprises auxiliary equipment (IL) for power generation of the fuel cell (1).

3. A fuel cell system (FS) according to claim 2, wherein the controller (8) is configured to control the first power (G) smaller than:

a possible generation of the fuel cell (1); and

a sum (W1+W2+Cp) of a power consumption (W1+W2) at the auxiliary equipment (IL) and a possible power charge (Cp) to the secondary cell (7).

4. A fuel cell system (FS) according to claim 2, further comprising a detection system (DS) configured to detect a first temperature (Ts) of the fuel cell (1) and a second temperature (Tb) of the secondary cell (7), wherein the controller (8) is configured to have:

the first power (G) increase, as the first temperature (Ts) is lower in rising speed than the second temperature (Tb); and

the second power (G) decrease and the third power (Dp) increase, as the first temperature (Ts) is higher in rising speed than the second temperature (Tb).

5. A fuel cell system (FS) according to claim 2, wherein the controller (8) is configured to control the first power (Gm) within a limited range depending on an SOC of the secondary cell (7).

6. A fuel cell system (FS) according to claim 2, wherein the controller (8) is configured to:

have the second power (Gr) limited within a higher range than a difference (Wi – Dp) between the third power (Dp) and fourth power (Wi) to be consumed at the auxiliary equipment (IL); and

control the power distributor (4) to interrupt power supply from the fuel cell (1), as the third power (Dp) is higher than the fourth power (Wi).

7. A fuel cell system (FS) according to claim 6, wherein the controller (8) is configured to limit the third power (Dp), as the third power (Dp) is higher than the fourth power (Wi).

8. A fuel cell system (FS) according to claim 2, wherein the controller (8) is configured to have a target SOC of the secondary cell (7) set for power generation (G) at the fuel cell (1) to be greater in variation.

9. A fuel cell system (FS) according to claim 8, wherein the controller (8) is configured to:

be responsible for an upper limit (UL) of the target SOC to have the second power (Gr) decreased within a higher range than a difference (Wi – Dp) between the third power (Dp) and fourth power (Wi) to be consumed at the auxiliary equipment

(IL); and

to have the second power (Gr) minimized, as the third power (Dp) is higher than the fourth power (Wi).

10. A fuel cell system (FS) according to claim 8, wherein the controller (8) is configured to be responsible for a lower limit (LL) of the target SOC to have the first power (Gm) increased within a lower range than a sum (Wi +Cp) of fourth power (Wi) to be consumed at the auxiliary equipment (IL) and a possible charge (Cp) to the secondary cell (7).

11. A fuel cell system (FS) according to claim 2, wherein the controller (8) is configured to have fourth power (Wi) to be consumed at the auxiliary equipment (IL), set higher than reference consumption ((Wi)) required for power generation of the fuel cell (1).

12. A fuel cell system (FS) according to claim 11,

wherein the auxiliary equipment (IL) comprises an oxidizer supply (3) configured to supply an oxidizer (Og) to the fuel cell (1), and

wherein the controller (8) is configured to increase power consumption (W2) at the oxidizer supply (3) for the oxidizer (Og) to be supplied by an increased flow rate at an increased pressure, to increase the fourth power (Wi).

13. A fuel cell system (FS) according to claim 11,

wherein the auxiliary equipment (IL) further comprises a cooling system configured for a water cooling of the fuel cell (1), with a cooling water line (L4) having a radiator (18) provided with a cooling fan (19), and a bypass member (17) to bypass the radiator (18), and

wherein the controller (8) is configured for operation of the bypass member (17) to increase power consumption (W2) at the cooling fan (19), to increase the fourth power (Wi).

14. A fuel cell system (FS) according to claim 11, wherein the controller (8) is configured to control the fourth power (Wi) within a lower range than a sum (Gr + Dp) of the second power (Gr) and the third power (Dp).

15. A fuel cell system (FS) comprising:

an energy supply (ES) comprising a fuel cell (1), a power distributor (4) connected to the fuel cell (1), and a secondary cell (7) connected to the power distributor (4);

a load set (IL, 6) connected to the power distributor (4); and

control means (8) for controlling the power distributor (4) to warm the energy supply (ES) by alternatively repeating:

a first power distribution (S22; SS61) having first power (G; Gm) generated at the fuel cell (1) and distributed to the secondary cell (7) and the load set (IL, 6); and

a second power distribution (S17; S71) having a combination (G+Dp; Gr+Dp) of second power (G; Gr) generated at the fuel cell (1) and third power (Dp; Dp) discharged from the secondary cell (7), distributed to the load set (IL, 6).

16. A control method of a fuel cell system (FS) comprising an energy supply (ES) comprising a fuel cell (1), a power distributor (4) connected to the fuel cell (1), and a secondary cell (7) connected to the power distributor (4), and a load set (IL, 6) connected to the power distributor (4), the control method comprising controlling the power distributor (4) to warm the energy supply (ES) by alternatively repeating:

a first power distribution (S22; SS61) having first power (G; Gm) generated at the fuel cell (1) and distributed to the secondary cell (7) and the load set (IL, 6); and

a second power distribution (S17; S71) having a combination (G+Dp; Gr+Dp) of second power (G; Gr) generated at the fuel cell (1) and third power (Dp; Dp) discharged from the secondary cell (7), distributed to the load set (IL, 6).